Claims

[c1] A distributed microwave cooking system, comprising:

[c2] a microwave generator having an output for providing a single source of microwave energy;

[c3] multiple cooking elements located remotely from the microwave generator;

[c4] a microwave conduit connecting each of the cooking elements to the microwave generator;

[c5] wherein the microwave energy generated by the microwave generator is distributed to the multiple cooking elements through the microwave conduits.

[c6] The distributed microwave cooking system according to claim 1, wherein the microwave conduit comprises a coaxial cable carrying the microwaves from the microwave generator to at least one of the cooking elements.

[c7] The distributed microwave cooking system according to claim 2, wherein the microwave conduit further comprises a waveguide connected to the output of the microwave generator and to one end of the coaxial cable to direct the microwaves from the microwave generator to the coaxial cable for distribution to the at least one of the cooking elements.

[c8] The distributed microwave cooking system according to claim 3, wherein the microwave conduit further comprises a switch attached to the other end of the coaxial cable, and the switch has multiple outputs to thereby switch the microwaves passing through the coaxial cable amongst the multiple outputs.

[c9] The distributed microwave cooking system according to claim 4, wherein the microwave conduit further comprises multiple feeder coaxial cables for connecting the switch outputs to the cooking elements.

[c10] The distributed microwave cooking system according to claim 5, wherein there is a feeder coaxial cable for each of the cooking elements.

[c11] The distributed microwave cooking system according to claim 3, wherein there are multiple coaxial cables and each coaxial cable connects a different cooking element to the waveguide.

[c12] The distributed microwave cooking system according to claim 7, wherein the waveguide comprises multiple channels and each channel corresponds to one of the coaxial cables.

[c13] The distributed microwave cooking system according to claim 3, wherein the coaxial cable has an inner conductor that extends into a channel formed in the interior of the waveguide to permit the transmission of the microwaves from the microwave generator, through the waveguide, and into the inner conductor.

[c14] The distributed microwave cooking system according to claim 9, wherein the portion of the inner conductor extending into the waveguide is tapered.

[c15] The distributed microwave cooking system according to claim 10, wherein the portion of the inner conductor extending into the waveguide is spaced 1/4 of a wavelength of the microwaves upstream from an end of the waveguide.

[c16] The distributed microwave cooking system according to claim 11, and further comprising an impedance tuner located within the channel upstream of the portion of the inner conductor extending into the waveguide.

[c17] The distributed microwave cooking system according to claim 1, wherein at least one of the cooking elements is a cooking cavity.

[c18] The distributed microwave cooking system according to claim 13, and further comprising a housing defining an open-face recess forming the cooking cavity, and a door moveably mounted to the housing for selectively closing the open-face recess.

[c19] The distributed microwave cooking system according to claim 14, wherein the housing and the door define a microwave choke to prevent the escape of microwaves from the cavity when the door is closed.

[c20] The distributed microwave cooking system according to claim 1, wherein at least one of

the cooking elements comprises a microwave lossy heating element that is coupled to the microwave generator by the microwave conduit resulting in the heating of the heating element in response to the receipt of the microwaves.

[c21] The distributed microwave cooking system according to claim 16, wherein at least one of the cooking elements is a warming drawer and the heating element is located within the warming drawer.

[c22] The distributed microwave cooking system according to claim 17, wherein the warming drawer comprises bottom, front, rear, left, and right walls, with one of the walls forming the heating element.

[c23] The distributed microwave cooking system according to claim 1, wherein the microwave generator is a magnetron.

[c24] The distributed microwave cooking system according to claim 1, wherein the microwave generator is a solid-state microwave generator.

[c25] A vehicle in combination with a distributed microwave cooking system, comprising:
a microwave cooking element located within the vehicle and accessible by a user of the vehicle;
a microwave generator located within the vehicle and remotely spaced from the microwave cooking element; and
a microwave conduit connecting the microwave generator to the microwave cooking element such that the microwaves generated by the microwave generator are directed to the microwave cooking element through the microwave conduit to cook an item with the microwave cooking element.

[c26] The combination of claim 21, wherein the microwave conduit comprises a coaxial cable carrying the microwaves from the microwave generator to the cooking element.

[c27] The combination of claim 22, wherein the microwave conduit further comprises a waveguide connected to the output of the microwave generator and to one end of the coaxial cable to direct the microwaves from the microwave generator to the coaxial cable

for distribution to the cooking element.

[c28] The combination of claim 23, and further comprising multiple microwave cooking elements located in the vehicle.

[c29] The combination of claim 24, wherein the microwave conduit further comprises a switch attached to the other end of the coaxial cable, and the switch has multiple outputs to thereby switch the microwaves passing through the coaxial cable amongst the multiple outputs and the microwave conduit further comprises multiple feeder coaxial cables for connecting the switch outputs to the cooking elements to thereby distribute the microwaves from the microwave generator to the multiple cooking elements.

[c30] The combination of claim 25, wherein there is a feeder coaxial cable for each of the cooking elements.

[c31] The combination of claim 24, wherein there are multiple coaxial cables and each coaxial cable connects a different cooking element to the waveguide.

[c32] The combination of claim 27, wherein the waveguide comprises multiple channels and each channel corresponds to one of the coaxial cables.

[c33] The combination of claim 21, wherein the vehicle comprises a passenger compartment and the microwave cooking element is located within the passenger compartment.

[c34] The combination of claim 29, wherein the microwave generator is located within the passenger compartment.

[c35] The combination of claim 29, wherein the vehicle comprises a storage area and the microwave generator is located in the storage area.

[c36] The combination of claim 31, wherein the vehicle comprises a trunk that defines the storage area.

[c37] The combination of claim 21, wherein the passenger compartment comprises a console having a selectively closeable cavity forming the cooking element.

[c38] The combination of claim 33, wherein the passenger compartment comprises spaced front

seats with the console is located between the spaced front seats.

[c39] The combination of claim 34, wherein the passenger compartment comprises a dash and a second cooking element is located in the dash and connected to the microwave generator by the microwave conduit.

[c40] The combination of claim 35, wherein the dash comprises a glovebox defining a selectively closeable cavity forming the second cooking element.

[c41] The combination of claim 21, wherein the cooking element comprises a housing having an open-top recess defining a cooking cavity sized to receive a cup, and a cover movably mounted to the housing for selectively closing the open-top cooking cavity with the cup positioned within the cavity, wherein the housing is located within the passenger compartment such that it is accessible by a user of the vehicle.

[c42] The combination of claim 37, wherein the cooking cavity comprises a cup support on which the bottom of the cup will rest when the cup is placed within the cooking cavity.

[c43] The combination of claim 38, wherein the microwave conduit comprises a coaxial cable having one end coupled to the microwave generator and an other end coupled to the cooking cavity to deliver the microwaves from the microwave generator to the cooking cavity.

[c44] The combination of claim 39, wherein the coaxial cable has an inner conductor with a portion that extends into the cooking cavity to form an antenna for transmitting the microwaves into the cooking cavity for direct contact with the cup.

[c45] The combination of claim 40, wherein the antenna is located beneath the cup support.

[c46] The combination of claim 39, and further comprising a heating element located within cooking cavity, the heating element being made from a microwave lossy material and directly connected to the other end of the coaxial cable such that the microwaves heat the heating element to introduce heat into the cooking cavity.

[c47] The combination of claim 42, wherein the heating element forms the cup support.

[c48] The combination of claim 37, and further comprising a temperature sensor located in the cooking cavity for determining the temperature of the contents of the cup.

[c49] The combination of claim 44, wherein the temperature sensor is an infrared sensor located on the cover such that the infrared sensor overlies the top of a cup positioned within the cooking cavity when the cover closes the cooking cavity.

[c50] The combination of claim 44, wherein the temperature sensor is a temperature probe that extends into the open top of a cup positioned within the cooking cavity when the cover closes the cooking cavity.

[c51] The combination of claim 37, and further comprising a load sensor for determining if a cup placed within the cooking cavity has a threshold volume of liquid.

[c52] The combination of claim 47, wherein the load sensor is weight sensor that detects a threshold weight for the load.

[c53] The combination of claim 47, wherein the load sensor comprises an excess microwave sensor for detecting the microwaves not absorbed by the contents of the cup.

[c54] The combination of claim 37, wherein the cover defines an open-bottom recess and the combination of the housing open-top recess and the cover open-bottom recess define the cooking cavity.

[c55] A microwave cup warmer for a vehicle, comprising:
a microwave cooking element for warming the contents of a cup;
a microwave generator located remotely from the microwave cooking element; and
a microwave conduit connecting the microwave generator to the microwave cooking element such that the microwaves generated by the microwave generator are directed to the microwave cooking element through the microwave conduit to cook an item with the microwave cooking element.

[c56] The microwave cup warmer of claim 51, wherein the cooking element comprises a housing having an open-top recess defining a cooking cavity sized to receive a cup, and a cover movably mounted to the housing for selectively closing the open-top cooking cavity with

the cup positioned within the cavity.

[c57] The microwave cup warmer of claim 52, wherein the cooking cavity comprises a cup support on which the bottom of the cup will rest when the cup is placed within the cooking cavity.

[c58] The microwave cup warmer of claim 53, wherein the microwave conduit comprises a coaxial cable having one end coupled to the microwave generator and an other end coupled to the cooking cavity to deliver the microwaves from the microwave generator to the cooking cavity.

[c59] The microwave cup warmer of claim 54, wherein the coaxial cable has an inner conductor with a portion that extends into the cooking cavity to form an antenna for transmitting the microwaves into the cooking cavity for direct contact with the cup.

[c60] The microwave cup warmer of claim 55, wherein the antenna is located beneath the cup support.

[c61] The microwave cup warmer of claim 56, and further comprising a heating element located within cooking cavity, the heating element being made from a microwave lossy material and directly connected to the other end of the coaxial cable such that the microwaves heat the heating element to introduce heat into the cooking cavity.

[c62] The microwave cup warmer of claim 57, wherein the heating element forms the cup support.

[c63] The microwave cup warmer of claim 54, wherein the microwave conduit further comprises a waveguide having one portion connected to the microwave generator and another portion connected to the one end of the coaxial cable to couple the coaxial cable to the microwave generator.

[c64] The microwave cup warmer of claim 59, wherein the coaxial cable has an inner conductor with a portion that extends into a channel formed in the interior of the waveguide to permit the transmission of the microwaves from the microwave generator, through the waveguide, and into the inner conductor.

[c65] The microwave cup warmer of claim 60, wherein the portion of the inner conductor extending into the waveguide is tapered.

[c66] The microwave cup warmer of claim 61, wherein the portion of the inner conductor extending into the waveguide is spaced 1/4 of a wavelength of the microwaves upstream from an end of the waveguide.

[c67] The microwave cup warmer of claim 62, and further comprising an impedance tuner located within the channel upstream of the portion of the inner conductor extending into the waveguide.

[c68] The microwave cup warmer of claim 52, and further comprising a temperature sensor located in the cooking cavity for determining the temperature of the contents of the cup.

[c69] The microwave cup warmer of claim 64, wherein the temperature sensor is an infrared sensor located on the cover such that the infrared sensor overlies the top of a cup positioned within the cooking cavity when the cover closes the cooking cavity.

[c70] The microwave cup warmer of claim 64, wherein the temperature sensor is a temperature probe that extends into the open top of a cup positioned within the cooking cavity when the cover closes the cooking cavity.

[c71] The microwave cup warmer of claim 52, and further comprising a load sensor for determining if a cup placed within the cooking cavity has a threshold volume of liquid.

[c72] The microwave cup warmer of claim 67, wherein the load sensor is weight sensor that detects a threshold weight for the load.

[c73] The microwave cup warmer of claim 68, wherein the load sensor comprises an excess microwave sensor for detecting the microwaves not absorbed by the contents of the cup.

[c74] The microwave cup warmer of claim 52, wherein the cover defines an open-bottom recess and the combination of the housing open-top recess and the cover open-bottom recess define the cooking cavity.